DOCUMENT RESUME

ED 210 030 IR 009 838

AUTHOR Semb, George B.
TITLE Contingency Arrangements in Personalized Instruction.
PUB DATE 81
NOTE 11p.; Paper presented at the Annual Meeting of the American Psychological Association (Los Angeles, CA, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Contingency Management; *Group Instruction; Higher Education; *Individual Characteristics; *Individualized Instruction; *Individual Needs; *Mastery Learning; Motivation Techniques; Pacing; Teaching Methods
IDENTIFIERS Personalized System of Instruction

ABSTRACT

This paper discusses a number of contingency arrangements used in studies at the University of Kansas to enhance individualized characteristics of personalized instruction. It begins with an examination of Keller's Personalized System of Instruction (PSI) and its five defining features: (1) reliance on the written word, (2) unit mastery, (3) the go-at-your-own-pace feature, (4) motivational lectures, and (5) the use of proctors. It argues that the core of personalized instruction is the unit mastery requirement which stipulates that students cannot progress from one unit to the next until the previous one has been mastered, and that all other PSI components only serve to enhance the unit mastery concept. Finally, the paper outlines several studies conducted at the University of Kansas and elsewhere which were designed to use contingencies to make personalized instruction more dynamic and flexible, and to make group-based classes more responsive to individual student needs. Ten references are listed. (MER)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED210030

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
[X] This document has been reproduced as received from the person or organization originating it.
[ ] Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Contingency Arrangements in Personalized Instruction

George B. Semb

Department of Human Development

University of Kansas

Lawrence, Kansas 66045

(913) 864-5614

Paper presented at the American Psychological Association, Division 2, Los Angeles, 1981.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
George Semb
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IR009838

Contingency Arrangements in Personalized Instruction

Keller's (1968) initial description of the Personalized System of Instruction (PSI) included five defining features: (1) reliance on the written word; (2) unit mastery; (3) the go-at-your-own-pace feature; (4) motivational lectures; and (5) the use of proctors. Since 1968, there has been a great deal of research comparing personalized instruction to other more conventional forms of instruction, as well as considerable research on the various components of the system. At the same time, several instructors have developed variations of personalized instruction such as group remediation (e.g., Michael, 1971), active remediation (e.g., Barton, Freeborn and West, 1981), contingency-managed lectures (e.g., Phillips and Semb, 1977), internal proctoring (e.g., Sherman, 1976), and self-grading (e.g., Blackburn, Hopkins and Semb, 1975). Many of these studies have been aimed at making personalized instruction more cost-effective, or at increasing its adaptibility to other settings (e.g., large lecture classes).

Despite the wealth of research that has been done, very little attention has focused on an analysis and evaluation of the actual contingencies that exist in personalized instruction. For example, reliance on the written word is simply a suggestion about how to present material; it says nothing specific about the interaction between the student and the instructional system. As it has evolved, however, reliance on the written word frequently takes the form of a study guide

that actively engages the student in the learning process. The go-at-your-own-pace feature is also a suggestion about how to design a personalized course so that students will have unlimited opportunities to master course content. Again, there have been several attempts to operationalize this component to promote more rapid or more uniform course progress, such as the use of deadlines, bonus points and early final examinations. Finally, the use of proctors is also a suggestion about how to handle the copious amounts of grading and paper work generated in a personalized course. Proctors per se are not a necessary part of the system as far as the student's interaction with it is concerned. Rather, they are facilitators.

All this is not to say that proctors, self-pacing and reliance on the written word are trivial parts of personalized instruction for research tells us that they are. Rather, my point is that these features enhance what I consider to be the core of personalized instruction--the unit mastery requirement. The unit mastery requirement states that students cannot progress from one unit to the next until the previous unit has been successfully mastered. Reliance on the written word facilitates unit mastery by providing students with continuous access to the material to be learned. The go-at-your-own-pace feature facilitates unit mastery by giving students numerous opportunities to redo the material until they get it right, or decide that the demands of the curriculum are too great. Proctors facilitate unit mastery by providing the medium (albeit a very personal one) through which the student's work is evaluated and tutoring can occur. Hence, these four components are facilitators. The only actual contingency on student per-

formance is the unit mastery requirement.

The last and least emphasized component of PSI, the motivational lecture, also involves a contingency on performance, at least as originally proposed by Keller (1968). Students could attend lectures only if they had successfully passed a prescribed number of units. Keller believed the lectures would motivate students to keep progressing in the course, but subsequent research has failed to lend empirical support to this contention. Currently, the role of lectures in personalized courses is varied and I know of few who still use it contingent upon course progress. Some instructors, however, use lectures as part of remediation activities, and I will discuss those a little later on.

Now that we have briefly discussed the five key components of personalized instruction and identified one primary contingency--unit mastery--I want to turn to a consideration of why an analysis of contingency arrangements is important.

Essentially, when a contingency is established for student performance (whether it is established for academic performance or rate of progress), the instructional system becomes more individualizd. Even though the same contingency is applied to everyone, as each student encounters it, the contingency becomes an individual one. Hence, this is the point where personalized instruction has so many advantages over more conventional forms of instruction because personalized instruction has the mechanism to respond to individual students.

I realize much of what I have said is already obvious to many of you, but I wanted to make it as clear as possible. I think contingencies such as unit mastery are not only what have made personalized instruction different from other educational systems, but more importantly, that they will make it even more dynamic in the future. Furthermore, they provide a common thread among the many variations of personalized instruction. For example, in Michael's (1971) group remediation procedure, in Barton, Freeborn and West's (1981) active remediation, and in Phillips and Semb's (1976) contingency-managed lecture, students enter a remediation condition only after their performance fails to meet a predetermined criterion (similar to the unit mastery requirement in personalized instruction). In the remainder of this paper, I want to outline several studies my colleagues and I at the University of Kansas have conducted over the past few years to use contingencies to make personalized instruction more dynamic and more flexible. I also want to outline several studies that have used contingencies to make group-based classes more responsive to individual student needs.

One frequent complaint of many students in personalized courses is the overwhelming number of unit assignments. Many students, particularly those for whom the material is relatively easy to comprehend, find the number of quizzes both unnecessary and aversive. As a potential solution to this problem, Bob Spencer (Spencer and Semb, 1978) devised a procedure by which students who successfully passed two unit quizzes in a row (on their first attempt each time) could elect to combine the next two units. Successful completion of 2, two-unit quizzes led to a condition in which students could combine three units. Not all

students who qualified elected to combine units, but those who did performed as well on summative measures as those who did not. Furthermore, students reported that they liked the opportunity to combine units. The important point here is that it was a contingency based upon the student's prior performance, one that led to increased flexibility for those students who qualified for and elected to exercise it. For those students who failed to qualify for the opportunity to combine units, the same unit mastery contingencies remained in effect. Thus, no students were forced to attempt something for which their prior performance suggested they were not ready.

Along a similar dimension, Colin Davies and David Born developed a graduated contingency for student pacing (Davies, Born and Semb, 1980). Students first signed a one-unit contract in which they agreed to complete a single unit by a given date. Once they had satisfied two, one-unit contracts, they were allowed to develop a two-unit contract. Successful completion of 2, two-unit contracts led to a three-unit contract and so on. Students who failed to meet the requirements of any contract entered daily testing, a condition in which they had to take a test every class day until the contract was fulfilled. Similar to Bob Spencer's unit combining contingency, students could progress to something more difficult (a two- or three-unit contract) only after they had demonstrated they could handle something less complex (a one-unit contract). Again, students were not forced to try something more complex unless they felt they could handle it. Some students never moved beyond a one-unit contract while others were able to successfully complete several three-unit contracts. Again, I want to emphasize that the

use of such contingency procedures increase the flexibility of the system without penalizing any individual student.

Another example of performance contingencies that C. J. Conard and I have recently investigated is the use of confidence ratings (Semb and Conard, 1980). When students took a quiz or exam, they rated how confident they were that each item was correct on a 5-point scale from "absolutely certain that it is correct" (1) to "uncertain whether it is correct or incorrect." (5) If the student rated the answer 1 (absolutely certain) or 2 (highly certain) and the answer was in fact incorrect, the proctor tutored the student over the item. These cases accounted for about 7% of all student responses. Moreover, they indicated that the student believed he or she had accurate knowledge of the material when in fact there was a serious misunderstanding. Proctors also tutored students who rated answers 3 (moderately certain), 4 (slightly certain), or 5 (uncertain), because these are items about which the student had a low level of confidence. In our research, these accounted for approximately 17% of all items answered. Please notice that the contingency was individualized in that students received feedback only over those answers about which they were uncertain (whether they answered them correctly or not) or about which they are highly certain, but answered incorrectly. The use of confidence ratings adds yet another dimension to student responding, and furthermore provides the staff with yet another way to provide feedback. Our research has shown that there is a high, but imperfect correlation between high confidence ratings and the probability of a correct response. It has also provided a useful way to do item analyses as well as identify individual dif-

ferences among students.

As mentioned earlier, performance contingencies are also evident in group remediation techniques such as those used by Michael (1971), Phillips and Semb (1976) and Barton, Freeborn and West (1981). In all of these systems, students enter a remedial condition only when test performance fails to meet a predetermined criterion. As John Drake, one of my colleagues, has observed, remediation is only part of the problem. The other part is prevention. That is, what should instructors do to help students pass a quiz the first time they attempt it? In a study recently published (Drake, Phillips and Semb, 1981), we analyzed a procedure designed to help students who demonstrated on previous quizzes that they were having trouble mastering the material. Students who scored less than 70% correct on the previous unit had to remediate the previous unit's material and attend "prevention" session that prepared them for the next unit. Analyses of group and individual data indicated that the procedure was effective. Furthermore, students thought that it was both fair and helpful. Again, please note that the contingency was aplied to only those students who needed extra help. Different from remediation systems, however, this procedure was also designed to address material students had not yet encountered.

This paper has attempted to outline a number of contingencies, all of which have been aimed at enhancing the individualized characteristic of personalized instruction. In all of the studies described, the student's prior performance has been used to determine what options or requirements exist in the future. Further, in each of the studies, I have

tried to point out how the contingency adds more flexibility by giving students increased options. I think contingencies of the kind presented here make a dynamic system even more responsive to individuals, not only as an instructional system, but also as a research setting for further analyses of human learning. In addition, by looking at how these contingencies affect individual students, I think we will be better able to perform the precise analyses that higher education deserves. Finally, by putting the emphasis on individual performance, I think we bring the focus of higher education back to where Fred Keller some 12 years ago argued that it should be when he said, "The student is always right."

References

Barton, E., Freeborn, G. B. and West, J. ARC: An engineering to university level group remediation of misconceptions. Journal of Personalized Instruction, in press, 1981.

Blackburn, T., Semb, G. and Hopkins, B. L. The comparative effects of self-grading on classroom efficiency and student performance in a personalized instruction course. In J. Johnston (Ed.), Behavior Research and Technology in Higher Education. Springfield, Ill.: Charles C. Thomas, 1975. Pp. 250-268.

Davies, C. S., Born, D. G. and Semb, G. Effects of performance-based pacing schedules on student performance in the personalized system of instruction. Journal of Personalized Instruction.

Drake, J. A., Phillips, T. W. and Semb, G. Analysis of a performance-based prevention procedure. Journal of Personalized Instruction, in press, 1981.

Keller, F. S. "Good-bye, teacher ..." Journal of Applied Behavior Analysis, 1968, 1, 79-89.

Michael, J. A behavioral analysis of behavioral college teaching systems. Paper presented at American Psychological Association, Washington, D.C., 1971.

Phillips, T. W. and Semb, G. Some effects of pre-quiz lectures, post-quiz lectures and a remediation procedure in a contingency- managed university course. In Fraley, L. E. and Vargas, E. A. (Eds.), Behavior Research and Technology in College and University Instruction. Department of Psychology, University of Florida, Gainesville, FL: 1976. Pp. 23-34.

Semb, G. and Conard, C. J. Student confidence ratings of examination answer correctness in a personalized system of instruction. Journal of Personalized Instruction, in press, 1980.

Sherman, J. G. A permutation on an innovation: A new role for proctors. In J. G. Sherman (Editor), PSI: 41 Germinal Papers. Menlo Park, CA: W. A. Benjamin, 1974.

Spencer, R. E. and Semb, G. Giving students the opportunity to increase unit size: A performance based system for personalized instruction. Journal of Personalized Instruction, 1978, 3, 76-80.